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The Threat of Nuclear War: Some Responses

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The possibility of nuclear holocaust threatens the very existence of the world community. Biologists, earth scientists, educators, lawyers, philosophers, physicists, physicians, and social scientists have addressed the problem from their special perspectives, and have had substantial impact on the public. Behavior analysts, however, have not as a whole contributed a great deal to the goal of preventing nuclear catastrophe. We argue that the threat of nuclear war is primarily a behavioral problem, and present an analysis of that problem. In addition, we address the difficulty of implementing behavioral interventions that would contribute to the survival of the world.

Various reactions occur when one contemplates these nuclear times: wonderment at the marvels accomplished by physical science and technology, perplexity at the devotion of so much talent and money to weapons designed expressly in order not to be used, and horror at the potential of this ever-expanding arsenal to render the earth uninhabitable. This horror is compounded with outrage at suggestions that under certain circumstances the weapons might actually be used, and the sheer absurdity of the fact that the destruction of all nations and peoples could result from the pursuit of "national security."

The dangers of nuclear war appear to be well understood by the leaders of the two major superpowers, and the declaratory policies of both speak of "deterrence," "defense," and the necessity of avoiding a nuclear war. Nevertheless, weapons now being developed and deployed by the United States and the Soviet Union indicate that these countries are prepared to unleash preemptive first strikes in the event of a severe crisis that makes escalation to nuclear warfare seem inevitable. Warhead characteristics, missle basing modes, related command and control systems, the development and testing of antisatellite weapons, and current plans for a ballistic missile defense are all consistent with this notion. The structure of the opposed forces, coupled with the very short flight times of some missiles, encourages a "launch-on-warning" policy and may predispose both sides to attack in the event of ambiguous data during such a crisis.

Given the fragility of world order, the predisposition to nuclear disaster is unacceptably high. In their book, *Living With Nuclear Weapons,* the Harvard Study Group (Carnesale, Doty, Hoffman, Huntington, Nye, & Sagan, 1983) outlines five general scenarios that illustrate the gamut of possible events that may occur: (a) surprise attack by one superpower on part or all of the nuclear forces of the other superpower, (b) an attack that is preemptive in nature, and launched in desperation during a time of crisis when one side believes the other side is about to strike first, (c) escalation from conventional warfare to nuclear warfare, (d) accidental uses of nuclear weapons resulting from technical malfunction or human error, and (e) nuclear wars initiated by other nuclear armed nations or by terrorist organizations. Based on these scenarios, and the possible interaction of two or more of them, we estimate somewhat subjectively the probability of a nuclear attack before the year 2000 to be between .25 and .50. Indeed, a majority of Americans believe nuclear war is imminent should arms negotiations fail and 50% of those under 30 believe nuclear war will occur within ten years (Yankelovich & Doble, 1984). No one can predict what *will* happen if the nuclear threshold is

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crossed, but every informed person knows what *could* happen—a major exchange leading to the extinction of *Homo sapiens,* and most if not all other living creatures on this planet.

Stop a minute now. We just said that our species, including our loved ones, could destroy itself with substantial probability in the foreseeable future. You, our reader, probably agree, although your analysis of the threat and your estimate of the likelihood of a nuclear attack may differ from ours. But most of the time, most behavior analysts, like most other people, do nothing about the nuclear threat.

According to the dicta of our field, the organism is always right. Presumably, this includes ourselves as behaving organisms. But in what sense is it right not to struggle against a clear threat to our very existence? Helen Caldicott, founder of Physicians for Social Responsibility, likens the global nuclear threat to cancer in an individual. If any of us, or a spouse, or a child, had cancer, we would do everything possible to arrest its course. Why is it that we behavior analysts do not use our unique talents to arrest the arms race and reduce the threat of nuclear extinction?

One possibility is that the problems posed by the nuclear arms race seem to be political, military, and technical. And so they are, but these problems arise from the *behavior* of politicians, military leaders, and technicians (Marcattilio, 1985)—and if any group should be able to identify, analyze, and modify problematic behavior, it is the readers of this journal. We are writing in part to remind you of that fact, and to urge you to consider the nuclear threat seriously, as a professional as well as a citizen.

Of course, considering the nuclear threat from a behavior-analytic perspective is only a start. It is of little use to point out the contingencies that establish and maintain the ballistic missile defense program, for example, if one cannot alter them. In our laboratories and clinics, we behavior analysts are accustomed to a fair amount of control—well-nigh absolute in the nonhuman laboratory. We routinely control variables in order to isolate the determiners of action, or implement programs that eliminate undesirable responses and establish appropriate activities in their stead. But in the arena of national security policy and military expenditures, we have no such power. Thus, we may be inactive, as behavior analysts, because the accustomed conditions for effective action (which provides powerful reinforcers for us) are absent.

How do we establish conditions for effective action? It is worth recalling, at this point, that the conditions for effective behavior analysis did not arise spontaneously. The founders of our field had to develop them, and push for their adoption in laboratories and classrooms and clinics. Many behavior analysts still have to struggle against institutional inertia whenever they seek to expand the field into new settings. But they have succeeded; the field has in fact expanded, and has made powerful contributions to human welfare. Thus, we should not be deterred from further expansion to address the great issues of survival and well-being in these nuclear times. At least three sorts of activity are needed: (1) analyzing the determinants of various classes of behavior that collectively comprise the nuclear threat, (2) developing programs to alter selected classes of behavior that are key components of the threat and that are feasible to modify, and (3) establishing the power base that is necessary to implement these programs. We consider these sorts of activities in what follows.

SOME DETERMINANTS

Aggressive Behavior

No doubt about it—initiating a nuclear attack would be the ultimate example of aggression. But are its determinants the same as for an attack by a Siamese fighting fish in a bowl, a child in a schoolyard, or even a platoon commander in combat? The latter examples can be explained fairly well by reference to evolutionary and ecological factors, histories of reinforcement, exposure to models, and current conditions of deprivation and stim-

ulation. However, the SAC general who may "press the button" under crisis conditions does not confront an opponent directly, and his responses are determined not only by his own history, but also by plans and options selected up to 20 years ago by various strategists and technicians unknown to him. These strategic and technical activities are, of course, preparations for war, but is it useful to classify them as "aggressive" if one wants to modify or prevent them?

The determinants of strategy and weapons development, it may be reasonably argued, reside in the reinforcement systems inherent in the realms of politics, economics, and technology. The relatively immediate consequences of power and money are obviously effective in controlling individual and group behavior, regardless of whether that behavior is ultimately aggressive or peaceable in effect. Thus, even a dovish senator may vote to authorize production of the MX missile, and a peaceable engineer may work on missile guidance systems, to avoid the loss of office and income. The senator's decision is no doubt affected by the fact that the American Security Council and other "peace through strength" groups actively support candidates who vote in favor of large military expenditures, in part with funds contributed to the Council by Lockheed, Boeing, and General Dynamics (Norgard & Rosenbloom, 1985). The engineer who works on guidance systems for one of these firms may applaud such expenditures because they maintain employment. There is every reason to believe that exactly the same political and economical processes would operate for peaceable ends if comparable sums were available for, say, public transportation or alternative energy development. Sadly, however, such is not the case.

In addition, the arms race is driven by a technological imperative that is less well understood. Referring to the development of the hydrogen bomb, J. R. Oppenheimer once remarked that "When you see something that's technically sweet you go ahead and do it and you argue about what to do about it only after you have had your technical success" (Jungk, 1958, p. 296). His remark reflects the fact that the intellectual efforts of scientists and engineers are reinforced by actual production and testing of the devices they design. Thus, it is not surprising that the most vigorous current opposition to a comprehensive ban on nuclear weapons tests results from the "professional enthusiasm" of people working in the weapons laboratories, not from their desire for a military confrontation with the Soviet Union (Smith, 1985). Evidently, the technological imperative operates independently of the aggressive or peaceable use of its products.

In summary, the SAC general's individual act of pushing the button cannot be understood and prevented without analysis and intervention into an extremely complex system. The aggregate behavior of preparing for nuclear war, on which his button-press must depend, is extended in time and involves diverse group and individual actions, each with its own set of interacting controlling variables, where rather few of these actions are "aggressive" in the usual sense. Any efforts at analysis must take the full complexity of this system into account, no matter how appealing it may seem to characterize its component actions in terms of their final horrifying effect.

Delayed Consequences and "Self Control"

The problem of dismantling the nuclear button has been discussed in relation to control by conflicting short-term and long-term consequences (e.g., Nevin, 1982, 1985). Continuing the arms race under the occasional management of "arms-control" negotiations has the immediate advantage of maintaining current payoff and power structures within each superpower and avoiding the immediate risk of destabilizing what passes for mutual security in this dangerous world. The eventual consequence of continuing the arms race, however, is probable catastrophe. Unfortunately, aversive consequences that are delayed exert little effective control over behavior.

Here, an analogy may be made to smoking, with its immediate sensory payoffs and its deferred costs in the form of probable lung cancer. Not long ago, the fact that people continued to smoke while acknowledging the long-term costs seemed mysterious, and there was little choice but to exhort smokers to exert "self control" until an analytic framework was provided by research and application (Ainslie, 1974; Rachlin, 1974). Now there are ways to address the problem—for example, by bringing the aversive consequence and related cues into the present and arranging an environment in which alternatives to the target behavior occur and are reinforced.

The threat of nuclear war, however, is more complex than the self-control of behavior by immediate vs delayed consequences. There is also a "distribution problem" in that the behavior of a few has consequences for many. How can the current actions of a few be altered by reference to deferred consequences for all including the unborn?

Philosophers would call this a problem of applied ethics. The problem is often brought home to one of us (JAN) after talks on the nuclear threat to audiences in his home state which proudly displays the motto "Live free or die" on its license plates. Local audiences, especially veterans, often ask whether the speaker believes in the state motto with reference to possible enslavement by the Soviet Union if the United States does not maintain nuclear superiority and stand ready to risk universal death. He answers, "Yes, for myself with my conception of freedom; and I support your belief, for yourself, with your conception of freedom. But none of us can make the decision for all of humanity, forever, on the basis of our present individual or national conceptions of freedom, however good and noble they may be." These fine words are not likely to be any more effective than trying to get a smoker to quit with reminders that his or her spouse will be distressed when cancer is detected 30 years down the road. This sort of ethical statement needs to be recast into behavior-analytic terms. By integrating our laboratory findings regarding the determiners of self-control as a function of delayed consequences (e.g., Grosch & Neuringer, 1981) with the information in the applied literature on self-management and behavior change (e.g., Skinner, 1953; Watson & Therpe, 1981), we should be able to suggest practical and effective strategies for modifying many of the classes of behavior that threaten all present and potential life.

War, Deterrence Theory, and Rule-Governed Behavior

According to Skinner (1969), "We refer to contingency-shaped behavior alone when we say that an organism behaves in a given way with a given probability because the behavior has been followed by a given kind of consequence in the past. We refer to behavior under the control of prior contingency-specifying stimuli when we say that an organism behaves in a given way with a given probability because it expects a similar consequence to follow in the future" (p. 147).

This distinction between contingency-shaped and rule-governed behavior is an important one for a prudent analysis of the process of war. To be sure, the aggressive behavior of the seasoned veteran in the trenches is a function of the contingencies of survival that he or she has been exposed to in the past. However, some activities of war beyond the battlefield, such as military and the supporting political strategy, are probably best understood as behavior that is under the control of contingency-specifying rules. For example, one does not have to be an expert in the history of war to recognize that each new war contains many of the successful strategic components of previous wars. The American colonists were successful against the columns of British troops because the colonists engaged in effective guerrilla warfare. American troops in turn experienced great difficulty in overpowering the North Vietnamese for the same reason. In our modern day "cold war," the leaders of the superpowers engage in rule-governed behavior when they parry such statements as "If you build and deploy 100 new ICBM's, I will add 100 also."

When the atomic bombs were dropped

on Hiroshima and Nagasaki some 40 years ago, the world community experienced devastating consequences in terms of death and destruction. On the basis of these events, the world community quickly realized that such behaviors must never occur again. As a result, world leaders developed a set of contingency-specifying rules in the form of "deterrence theory." The notion of mutually assured destruction, by far, meets the criteria of an effective rule in that, first, it is derived from a very salient event. Second, it brings the remote consequences (of nuclear exchange leading to total annhilation) into immediate play. Third, rules are especially effective when the natural contingencies would otherwise shape unwanted or wasteful behavior; it is apparent in this case that we cannot experiment with these natural contingencies. Fourth, by providing an analysis of possible alternatives and examining their respective consequences, deterrence theory has functioned as an effective discriminative stimulus evoking behavior that is more efficient than the behavior managed by exposure to unanalyzed contingencies. Fifth, and finally, contingency related stimuli are most noticeably operable where little or no experiential history is involved; deterrence theory is based on two data points (Hiroshima and Nagasaki) that are in all likelihood technically obsolete.

In short, deterrence theory should work and has worked for 30 years and it would not make much practical sense to break something that works. But, an additional characteristic of rules must be considered: Rules evolve and change with a culture. Can the rules specified by the concept of mutually assured destruction remain effective with changes in the physical and social contingencies that will exist in "tomorrow's" world? Or put in another way, is deterrence theory reliable? Perhaps not. Wallace (1979) presents data showing that between 1816 and 1965, armed conflict was preceded by arms buildup in 23 out of 28 cases (82%). Conversely, in 73 cases in which a dispute did not lead to war, only 5 (or 7%) were preceded by an arms race. In other words, the odds are much more in favor of escalation given the precondition of massive arms buildup (also see Diehl, 1983).

Given these data, the ever-changing cultural contingencies, and the simple fact that it doesn't make much sense to avoid nuclear war by engaging in approximations to it (i.e., building arms and engaging in specific classes of verbal behavior), alternatives to deterrence theory must be developed. In this search for viable options, we must remember that deterrence theory will not go away very easily. These rules specifying the negative consequences of certain behaviors are highly resistant to change. As such, more favorable alternatives must possess unique and salient characteristics if they are to compete with and ultimately replace the peace through strength notion.

PROGRAMS

Education

In his 1983 address to the Association for Behavior Analysis, Skinner argued, quite pessimistically, that the short-term self-interest of the three controlling "estates"—government, church, and capital—would always oppose and take precedence over the long-term general interest. The "fourth estate"—scientists, educators, writers—is relatively free of this dilemma because its short-term self-interest in advancing and communicating knowledge may often coincide with the long-term general interests. Although the fourth estate lacks the power to affect the three controlling agencies directly, it may do so indirectly by educating the populace, whose at least passive support is essential for the three estates to maintain control. Skinner, however, questioned the long-term effectiveness of educational programs that threaten the controlling estates. In his 1983 presentation to the American Psychological Association (Skinner, 1985), and in other places (Skinner, 1953, 1971, 1972), he suggests that the fourth estate could make a contribution by "designing cultural practices in which people are induced by positive reinforcement to produce the goods they need and to treat each other well" (see Wagner, 1985, for a reaction).

Perhaps we can move toward the requisite cultural changes with a variety of eductional programs in formal and informal settings.

Educational programs are important for other reasons. First of all, people are quite poorly informed about the nuclear threat. One of us (AJMM) asked a group of high school juniors and seniors and a group of elementary and high school teachers the following question: "On what two cities were the first atomic bombs dropped?" The teachers' accuracy rate was disappointing—about 84%. More dismal was the fact that the students as a group exhibited an accuracy rate of only 60%, with two votes for Iwo Jima and one for Pearl Harbor. The other of us (JAN) asked a similar multiple-choice question to college students in an introductory psychology class. Although 100% correctly identified Hiroshima as the first target, only 66% correctly identified Nagasaki as the second. Moreover, only 28% of these students were familiar with the concept of the strategic triad of bombers, land-based missiles, and submarine-launched missiles; and only 16% were familiar with the recently-failed Euromissile negotiations. These informal surveys are in accordance with a more formal and systematic inquiry reported by Zweigenhaft (1984, 1985). Thus, many people are not well informed about current nuclear issues, and older people who remember the horrors of Hiroshima and Nagasaki are dying or forgetting (see Hersey, 1985, for a description of the survivors of Hiroshima, 40 years after the bomb).

The inscription on the memorial cenotaph at Hiroshima reads: "Rest in peace, for the mistake shall not be repeated." But if the nature of the "mistake" and the present conditions that make more "mistakes" possible are not generally known, the mistake may in fact be repeated. In the language of behavior analysis, the stimulus control exerted by the first nuclear holocaust is fading away.

Feshbach, Kandel, and Haist (1985) provide another reason to argue for education on nuclear matters. They found a high correlation between overall information, as measured by test items dealing with a variety of nuclear issues, and favorable attitudes toward a nuclear moratorium. Of course, this correlation does not guarantee that education (which presumably increases the availability of information) will change either attitude statements or, more importantly, lead to action. A study by Oskamp, King, Burn, Konrad, Pollard, and White (1985), however, provides a suggestive link to behavior. They surveyed attitudes before and after the television film *The Day After,* and found that the film increased concern over the threat of nuclear war. In a posttest, they also asked whether their subjects wished to have their names placed on mailing lists of organizations that either supported or opposed nuclear armaments. People who saw the film were more than twice as likely to make this behavioral commitment as those who did not see it, and their preference was strongly for the antinuclear groups. Those who made this commitment were more likely than nonrequesters to make verbal statements favoring a nuclear moratorium. Schofield and Pavelchak (1985) have presented similar findings that support the work of Oskamp et al. (1985). Thus, it appears that both verbal statements and other actions can be affected by films like *The Day After,* which are both arousing and informative.

Behavior analysts can address the nuclear threat in a number of educational settings. Those who work in university departments can easily include discussion of the nuclear threat in courses on experimental or applied analysis of behavior, in conjunction with such topics as aggression, avoidance, choice, cooperation, competition, modelling, and self-control. Colleagues can be urged to do likewise (e.g., in relation to attitudes and persuasion in social psychology, signal detection in sensory psychology, decision-making in cognitive psychology, and effects of threats in child psychology and human development). Entire courses can be arranged—perhaps in collaboration with physicists, historians, political scientists, and ROTC instructors—on the nuclear arms race.

Others who work in community or school settings can strive to insure that the nuclear threat is discussed in relation

to community problems (e.g., civil defense and evacuation programs, or the lack of funds for social programs), or as part of public school curricula (see Kimmel, 1985, for an excellent description of a widely adopted junior high school program called *Choices*).

Less formally, our university, community, and school involvements can serve as bases for arranging talks or film programs for student, faculty, church, and adult-education groups. Also, we can educate by stimulating "consciousness-raising" debates on such issues as declaring the town or university a "nuclear-free zone" (see Killeen, 1985, for an account of this approach). Finally, let us remember to reinforce edcuational behavior on the part of others. For example, we can write commending letters to our local television stations for airing *Threads,* and publicize the show on the station's behalf. Or we can offer to give guest lectures on the nuclear threat for colleagues who express concern over the deficiencies in their student's knowledge. The idea is to permeate the environment with discussions and programs that provide educational opportunities for everyone, not just peace-group regulars.

Research

Behavior analysis implies a commitment to empirical data as a basis for solving problems, but as matters stand, very few solid, generalizable findings exist to support any particular approach to the prevention of nuclear war. Relevant research will not be easy to accomplish, but the need is clear, and some starting places exist. Schmidt (1984) reviews the existing research in the area of cooperation and competition, and calls for the systematic study of a variety of dependent variables including behavioral interaction among group members, range and variability of performance, and group output. Potential independent variables include the stimulus properties of others, opportunities for auditing, type of reinforcement contingencies, group size, and cost effectiveness of various courses of action. The effects of such variables on individual and group behavior can be examined and interpreted in relation to the threat of nuclear war. This kind of research, along with that reported by Hake and Schmid (1981) on the acquisition of trusting behavior, would seem to be a valuable avenue to follow to enhance the understanding and practice of nonviolent conflict resolution.

Related issues are raised in the literature on social dilemmas, social traps, and the "tragedy of the commons" (e.g., Dawes, 1980; Komorita & Lapworth, 1982; Platt, 1973; Schroeder et al., 1983). Nevin (1985) discusses the nuclear threat in relation to the tragedy of the commons, and Costanza (1984) provides an explicit treatment of the nuclear arms race as a social trap, with discussion of some relevant variables that could be examined experimentally. Other possibilities for research arise in simulations of "international" crisis control and conflict resolution, such as the "Firebreaks" exercise.[1] Although the majority of the studies along these lines appear in journals devoted to social psychology, and have its characteristic research style, there is no reason why the experimental-analytic style cannot be brought to bear on these problem areas. Perhaps by research endeavors of this sort we can answer Neuringer's (1984) call for melioration in behavior analysis, which can only lead to melioration of the human condition.

POWER

Behavior analysts already have the power to acquire the information needed for analysis of the nuclear threat, to arrange educational programs, and to conduct research. Where this is not the case, power can be gained through the sorts of institutional arrangements that we are accustomed to in our working lives. We do not, however, now have the power to use our analyses and research results to intervene effectively into the system of contingencies that drives the arms race, but at least two avenues are available.

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[1] More information and "Firebreaks" kits may be obtained from Ground Zero Minnesota, P.O. Box 13127, Minneapolis, MN 55414.

Professional Associations

Concerned behavior analysts can organize, as a part of the Association for Behavior Analysis, so that we speak as representatives of a group rather than as individuals when we pursue our various efforts on behalf of nuclear sanity. Indeed, two such organizations already exist: Behavior Analysts Against Nuclear War (BAN WAR)[2] and Behaviorists for Social Action (BFSA).[3] There is also a well-established group within the American Psychological Association: Psychologists for Social Responsibility (Psy SR).[4] Professional organizations of this sort not only provide credibility and social support for their members, but can acquire some clout in their own right (see comments by Congressman Markey, 1985, on the American Psychological Association's call for a freeze on nuclear weapons).

Professional groups can also form coalitions with other organizations to work directly in the arena of national politics. Currently, the Professionals Coalition for Nuclear Arms Control brings together the strengths of the Union of Concerned Scientists, Physicians for Social Responsibility, and the Lawyers Alliance for Nuclear Arms Control. Perhaps the Coalition could be broadened to include other groups such as BAN WAR and BFSA. The result could be an even more vigorous voice in lobbying efforts for arms control and disarmament. Behavior analysts could make a distinctive contribution to the political work of the "fourth estate" in this way.

The international character of behavior analysis often gives us contact with colleagues in many other nations who are likely to share our concerns, and we can use these to form international groups for educational and political purposes. The potential effectiveness of international scientific groups has been shown clearly with the recent award of the Nobel Peace Prize to the International Physicians for the Prevention of Nuclear War, and the attendant publicity that their cause—our cause—has received. As scientists, teachers, and therapists concerned with the understanding of behavior and enhancing the quality of life, we may be able to make a similar contribution in collaboration with other behavioral scientists who hold the same view throughout the world.

Grass-Roots Organizing

Ultimately, power comes from the people. There has been a huge resurgence of the peace movement in Western Europe since the late 1970's, and in the U.S. since 1980. This movement was initially aroused by plans to deploy Pershing II and cruise missiles in several NATO countries. Later, it was bolstered by open talk of "fighting and winning a nuclear war" by the President of the U.S. and his advisors. In the U.S. at least, the movement has lost some of its momentum, partly through the failure of the freeze movement to get an effective resolution through Congress, or to elect "peace candidates" when Reagan swept the last election. The peace movement is clearly suffering from the effects of nonreinforcement. But the grass-roots groups that sprang up during the early 1980's are still in place, and opinion polls still show strong public concern about the threat of nuclear war, and support for negotiation rather than confrontation with the U.S.S.R. (Yankelovitch & Doble, 1984). Thus, there are excellent opportunities which exist to revitalize the movement with a few reinforcers. In doing so, we must remember that the peace movement is made up of a very heterogeneous group and we must continually respect the aforementioned maxim—"The individual is always right."

Such reinforcers are not likely to be forthcoming at the national or international level, as weapons developments proceed apace and each superpower rejects the other's call for moratoria or negotiations as mere posturing. But reinforcers can be obtained at the grass-roots

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level, for example, as movement workers see their educational efforts take hold locally in communities, schools, and universities (an approach termed "the psychology of small wins" by Weick, 1984). Behavior analysts can make a real contribution by working openly with peace-movement groups to help them analyze their own successes and failures, and to identify programs that will succeed often enough to maintain vigorous efforts toward disarmament and peace. Nevin (1985) has argued that "peace activism" can be construed as an operant class for individuals, so that reinforcement of a few members of the class can maintain the entire class. This idea should be tested with groups as well.

Few behavior analysts have direct experience with grass-roots organizing, so it may come as a surprise to discover that many of our working principles coincide with guidelines based on organizing experience. Saul Alinsky, one effective community organizer, has summarized some "Rules for Radicals" in his 1972 book by that title. Among his rules are: "Never go outside the experience of your people" (i.e., don't expect behavior that is not already within the repertoire of the people you're working with); "A good tactic is one your people enjoy" (i.e., choose methods that involve immediate reinforcers to maintain action despite the remoteness of your goal); and above all, "Do what you can with what you have" (i.e., be flexible and pragmatic, exactly like any good practicing behavior analyst).

SUMMARY AND CONCLUSION

Nuclear war is primarily a behavioral problem. We have provided an analysis of some of the behaviors that may be collectively called the nuclear threat. In providing our analysis, we have focused on such concepts as secondary reinforcement, delayed consequences, contingency-shaped behavior, rule-governed behavior, and cultural contingencies in general. Some research strategies were also presented with regard to these. Finally, we argued that educating the public and providing support services for the various branches of the peace movement are extremely important activities leading to the circumvention of nuclear holocaust.

In contemplating a life's work in scientific psychology, Tolman (1959) mused that he may have been right and he may have been wrong, but in the end the only sure criterion is to have fun. We would like to submit that while our speculations and analyses regarding the nuclear threat may be right or may be wrong, in the end the only sure criterion is to have engaged in some appropriate activities. To do less than commit a portion of our skills to solving what is perhaps the greatest social problem in the history of the world is to commit ourselves, or our posterity, to certain doom. Behavior analysis as a conceptual framework, and behavior analysts as individuals, have provided an approach that in less than 50 years has made an enormous contribution to improving the human, and perhaps the nonhuman, condition. To refrain from applying this distinctive approach to the problem of the nuclear threat would be an admission that something is wrong with our world view. We would like to think that such a notion is foreign to a dedicated behavior analyst.

It is quite possible, as Skinner (personal communication, 1982) has remarked, that behavior analysis has arrived on the scene just in time. In the end, however, behavior analysis will not save the world—people will—but they need the tools by which to do it, and our discipline should be instrumental in providing many of those tools. With that, take a few minutes now and imagine as hard as you can a world free of nuclear weapons.

REFERENCES

Ainslie, G. W. (1974). Impulse control in pigeons. *Journal of the Experimental Analysis of Behavior, 21,* 485–489.

Alinsky, S. (1972). *Rules for radicals.* New York: Random House.

Carnesdale, A., Doty, P., Hoffman, S., Huntington, S. P., Nye, J. S., & Sagan, S. D. (1983). *Living with nuclear weapons.* New York: Bantam Books.

Costanza, R. (1984). The nuclear arms race and the theory of social traps. *Journal of Peace Research, 21,* 79–86.

Dawes, R. M. (1980). Social dilemmas. *Annual Review of Psychology, 31,* 169–193.

Diehl, P. F. (1983). Arms races and escalation: A closer look. *Journal of Peace Research, 20,* 205–212.

Feshbach, S., Kandel, E., & Haist, F. (1985). Attitudes toward nuclear armament policies: An example of social research in behalf of social advocacy. In S. Oskamp (Ed.), *Applied social psychology annual* (vol. 6, pp. 107–126). Beverly Hills: Sage.

Grosch, J., & Neuringer, A. (1981). Self control in pigeons under the Mischel paradigm. *Journal of the Experimental Analysis of Behavior, 35,* 3–21.

Hake, D. F., & Schmid, T. L. (1981). Acquisition and maintenance of trusting behavior. *Journal of the Experimental Analysis of Behavior, 35,* 109–124.

Hersey, J. (1985). Hiroshima: The aftermath. *The New Yorker,* July 15, 37–63.

Jungk, R. (1958). *Brighter than a thousand suns.* New York: Harcourt, Brace, Jovanovich.

Killeen, P. (1985). Weapons and the university. *BANWAR Newsletter, 1,* 1–4.

Kimmel, P. R. (1985). Learning about peace. *American Psychologist, 40,* 536–541.

Komorita, S. S., & Lapworth, C. W. (1982). Alternative choices in social dilemmas. *Journal of Conflict Resolution, 26,* 692–708.

Marcattilio, A. J. M. (1985, May). *Behavior analysis and nuclear war: Forever the twain should meet.* Paper presented at the meeting of the Association for Behavior Analysis, Columbus, Ohio.

Markey, E. J. (1985). The politics of arms control: A matter of perception. *American Psychologist, 40,* 557–560.

Neuringer, A. (1984). Melioration and self-experimentation. *Journal of the Experimental Analysis of Behavior, 42,* 397–406.

Nevin, J. A. (1982). On resisting extinction: A review of Jonathan Schell's *The fate of the earth. Journal of the Experimental Analysis of Behavior, 38,* 349–353.

Nevin, J. A. (1985). Behavior analysis, the nuclear arms race, and the peace movement. In S. Oskamp (Ed.), *Applied social psychology annual* (vol. 6, pp. 27–44). Beverly Hills: Sage.

Norgard, L., & Rosenbloom, J. (1985). The cold warriors. *Common Cause Magazine, 11(4),* 14–19.

Oskamp, S., King, J. C., Burn, S. M., Konrad, A. M., Pollard, J. M., & White, M. A. (1985). The media and nuclear war: Fallout from TV's *The Day After.* In S. Oskamp (Ed.), *Applied social psychology annual* (vol. 6, pp. 127–158). Beverly Hills: Sage.

Platt, J. (1973). Social traps. *American Psychologist, 28,* 641–651.

Rachlin, H. (1974). Self-control. *Behaviorism, 2,* 94–107.

Schmidt, D. R. (1984). Interpersonal relations: Cooperation and competition. *Journal of the Experimental Analysis, 42,* 377–383.

Schofield, J., & Pavelchak, M. (1985). *The Day After:* The impact of a media event. *American Psychologist, 40,* 542–548.

Schroeder, D. A., Jensen, T. D., Reed, A. J., Sullivan, D. K., & Schwab, M. (1983). The actions of others as determinants of behavior in social trap situations. *Journal of Experimental Social Psychology, 19,* 522–539.

Skinner, B. F. (1953). *Science and human behavior.* New York: The Free Press.

Skinner, B. F. (1969). *Contingencies of reinforcement: A theoretical analysis.* New York: Appleton-Century-Crofts.

Skinner, B. F. (1971). *Beyond freedom and dignity.* New York: Knopf.

Skinner, B. F. (1972). The design of cultures. In *Cumulative Record* (3rd ed.). New York: Appleton-Century-Crofts.

Skinner, B. F. (1983, May). *Why we are not acting to save the world.* Paper presented at the meetings of the Association for Behavior Analysis, Milwaukee, WI.

Skinner, B. F. (1985). Toward the cause of peace: What can psychology contribute? In S. Oskamp (Ed.), *Applied social psychology annual* (vol. 6, pp. 21–25). Beverly Hills: Sage.

Smith, R. J. (1985). Weapons labs influence test ban debate. *Science, 229,* 1067–1069.

Tolman, E. C. (1959). Principles of purposive behavior. In S. Koch (Ed.), *Psychology: A study of a science* (vol. 2, 92–157). New York: McGraw-Hill.

Wagner, R. (1985). Psychology and the threat of nuclear war. *American Psychologist, 40,* 531–535.

Wallace, M. (1979). Arms races and escalation: Some new evidence. *Journal of Conflict Resolution, 23,* 3–16.

Watson, D. L., & Tharpe, R. F. (1981). *Self-directed behavior: Self-modification for personal adjustment.* Monterey, CA: Brooks/Cole.

Weick, K. E. (1984). Small wins: Redefining the scale of social problems. *American Psychologist, 39,* 40–49.

Yankelovich, D., & Doble, J. (1984). The public mood: Nuclear weapons and the USSR. *Foreign Affairs, 63,* 33–46.

Zweigenhaft, R. (1984). What do Americans know about nuclear weapons. *Bulletin of the Atomic Scientists,* February, 48–50.

Zweigenhaft, R. (1985). Students surveyed about nuclear war. *Bulletin of the Atomic Scientists,* February, 26–27.